

Ad-Hoc Method for IMS Intercomparison of Trace Explosive Test Materials

1. Scope

- 1.1 This method is used to evaluate interlaboratory detector responses to standard trace residues of explosive compounds placed on test strips.
- 1.2 This practice does not address or utilize sampling procedures common to the use of trace explosive detectors. It only tests the response of the detector once a test strip has been successfully introduced into the explosive detector.
- 1.3 This practice does not evaluate the effect of contaminants or interferences that may be encountered in sampling for trace explosives in the field.
- 1.4 This practice does not address any documentation requirements that may be required.
- 1.5 This method does not address the safety concerns, if any, associated with its use. It is the responsibility of the user of this practice to establish appropriate safety and health practices for the handling and disposal of materials used.

2. Terminology

- 2.1 Definitions of terms specific to this ad-hoc method:
- 2.2 High explosive, adj., n - explosives characterized by a very high rate of reaction, high pressure development, the presence of a supersonic detonation wave in the explosive, and which can be caused to detonate by means of a blasting cap when unconfined.
- 2.3 IM (Intercomparison Material) sheet, adj, n – an 8.5” by 11” piece of paper that contains ten test strips (either explosive test strips or process blank strips). Each IM sheet is uniquely identified by date and sequence number.
- 2.4 Explosive test strip, n – a rectangular (about 1” by 3”) piece of paper cut out from the IM sheet. Each explosive test strip has been dosed with an explosive compound.
- 2.5 Instrument blank swipe – adj., adj. n. - an unused swipe, freshly removed from the container provided by the manufacturer.
- 2.6 Calibration, v. - the act of providing the detector with a known substance so that it may learn to correctly identify explosive compounds. Manufacturers of explosives detectors often provide calibration swipes. In an IMS instrument, calibration allows the instrument to adjust the present values of the mobility (or drift) time of the calibrant to the most current conditions. Some IMS explosives detectors may have built-in materials and software to automatically perform calibration.

4. Procedure

4.1 Preparation of workspace

- 4.1.1 Cover table of bench surface with clean, absorbent, disposable material.
- 4.1.2 Care should be taken not to contaminate the testing materials. Handling the IM sheets and test strips with either unused gloves or clean tweezers is recommended. It is particularly important not to touch the blank target area of the test strips.
- 4.1.3 Provide convenient and appropriate means of disposal of used test strips and other consumables.
- 4.1.4 Unused sample swipes will be also needed for testing as instrument blank swipes. These should not be removed from the vendor-supplied containers (typically cans) until needed.

5. Analysis of test swipes

- 5.1 *Power on.* Ensure that the trace explosives detector is powered on and completed the warm up period according to the instructions provided with the detector. This may require 15 minutes or more.
- 5.2 *Calibration.* If the detector requires manual calibration prior to evaluating samples, insert the calibration swipe provided by the manufacturer according to the instruction provided in the detector manual. Confirm proper calibration and that the instrument is ready to accept samples. For many detectors a 'Ready' signal will be displayed. If the instrument provides automatic calibration, verify that the instrument is 'Ready' to accept samples.
- 5.3 *Analyze instrument blank swipe.* Before testing with the prepared swipes, place the instrument blank into the detector according to the manufacturer's instructions. Confirm that the detector does not provide an alarm signal for any of the explosive compounds. If the detector continues to provide an alarm with repeated testing, maintenance may be required, such as cleaning of the inlet.
- 5.4 *Analyze explosive test strips.* Analyze each of the ten explosive test strips in turn, followed by the analysis of an instrument blank swipe (see section 5.3). Record results for each test strip on the Measurement Data Recording Form. The reactant ion peak (RIP) amplitude should also be recorded.

Measurement Data Recording Form

IM Sheet Identity_____

Test strip 1 (Comment_____)

(Expl) RIP Amplitude and drift time_____

(Narc) RIP Amplitude and drift time_____

Substance Detected_____

Drift Time_____

Amplitude_____

Second substance detected?_____

Drift Time_____

Amplitude_____

Test strip 2 (Comment_____)

(Expl) RIP Amplitude and drift time_____

(Narc) RIP Amplitude and drift time_____

Substance Detected_____

Drift Time_____

Amplitude_____

Second substance detected?_____

Drift Time_____

Amplitude_____

Test strip 3 (Comment_____)

(Expl) RIP Amplitude and drift time_____

(Narc) RIP Amplitude and drift time_____

Substance Detected_____

Drift Time_____

Amplitude_____

Second substance detected?_____

Drift Time_____

Amplitude_____

Test strip 4 (Comment_____)

(Expl) RIP Amplitude and drift time_____

(Narc) RIP Amplitude and drift time_____

Substance Detected_____

Drift Time_____

Amplitude_____

Second substance detected? _____

Drift Time _____

Amplitude _____

Test strip 5 (Comment _____)

(Expl) RIP Amplitude and drift time _____

(Narc) RIP Amplitude and drift time _____

Substance Detected _____

Drift Time _____

Amplitude _____

Second substance detected? _____

Drift Time _____

Amplitude _____

Test strip 6 (Comment _____)

(Expl) RIP Amplitude and drift time _____

(Narc) RIP Amplitude and drift time _____

Substance Detected _____

Drift Time _____

Amplitude _____

Second substance detected? _____

Drift Time _____

Amplitude _____

Test strip 7 (Comment _____)

(Expl) RIP Amplitude and drift time _____

(Narc) RIP Amplitude and drift time _____

Substance Detected _____

Drift Time _____

Amplitude _____

Second substance detected? _____

Drift Time _____

Amplitude _____

Test strip 7 (Comment _____)

(Expl) RIP Amplitude and drift time _____

(Narc) RIP Amplitude and drift time _____

Substance Detected _____

Drift Time _____

Amplitude _____

Second substance detected? _____
Drift Time _____
Amplitude _____

Test strip 8 (Comment _____)

(Expl) RIP Amplitude and drift time _____
(Narc) RIP Amplitude and drift time _____

Substance Detected _____
Drift Time _____
Amplitude _____

Second substance detected? _____
Drift Time _____
Amplitude _____

Test strip 9 (Comment _____)

(Expl) RIP Amplitude and drift time _____
(Narc) RIP Amplitude and drift time _____

Substance Detected _____
Drift Time _____
Amplitude _____

Second substance detected? _____
Drift Time _____
Amplitude _____

Test strip 10 (Comment _____)

(Expl) RIP Amplitude and drift time _____
(Narc) RIP Amplitude and drift time _____

Substance Detected _____
Drift Time _____
Amplitude _____

Second substance detected? _____
Drift Time _____
Amplitude _____

Test Operator Signature _____ Date _____